

orbis and *Lymnaea* apparently in a marine Pleistocene formation in a California sea cliff. Careful investigation proved conclusively that the fresh-water mollusks had lived in a small stream channel cut in the marine formation after it was elevated above the tide, and the channel had afterwards been filled to a level with the general surface of the elevated marine beds. The foregoing are only a few of the many difficulties that beset the paleontologist.

FURTHER RECORDS OF WESTERN CANADIAN MOLLUSCA

ALAN MOZLEY

The Johns Hopkins University

This paper is one of a series dealing with the distribution of the Western Canadian mollusca (see NAUTILUS, XXXIX, pp. 121-128; XL, pp. 54-63; XLII, pp. 13-18). In the course of this work many observations have been made on other phases of the biology of these forms, but the information thus collected is reserved for subsequent publication in more comprehensive form. In all these papers an effort has been made to render the citation of the records as concise as possible, but at the same time to have them sufficiently definite to avoid misunderstanding.

The discovery of living molluscs (*Lymnaea vahlü*) in the waters of Little Quill Lake, Saskatchewan, is of some interest, since this is a highly alkaline lake. An analysis is given below.

ANALYSIS OF WATER FROM LITTLE QUILL LAKE,
SASKATCHEWAN¹

Collected June 12th, 1928. Three miles south of Paskweggin siding.

Made by Dr. Paul Hiebert, University of Manitoba.

Total Solids	9688	parts per million
Alkalinity (as CaCO ₃)	298.5	parts per million
Chlorides	680.	parts per million
Sulphates	5104.	parts per million
N as NO ₃	.02	parts per million
Calcium	96.	parts per million
Magnesium	793.	parts per million
Iron	.05	parts per million

Further investigations on the distribution of the molluscs in the alkaline lakes of Western Canada are at present in progress.

Family HELICIDAE

Vallonia costata (Müller). ONTARIO. Fort Frances. MANITOBA. Grande Pointe. SASKATCHEWAN. Kamsack, near Madge Lake in Duck Mountain, twenty miles north of Kamsack; Quill Lake (station); Wynyard, near Little Quill Lake; Wadena, near Foam Lake; Dafoe; Lanigan; Watson; Dalesford, near Lake Lenore; Kelliher; Touchwood; Humboldt; Saskatoon.

Vallonia sp. ONT. Fort Frances.

Family PUPILLIDAE

Strobilops affinis Pilsbry. ONT. Fort Frances. MAN. Grand Beach.

¹ It should be pointed out that the molluscs were found actually living in this solution, not merely at the mouths of the fresh water creeks.

Family COCHLIOPIDAE

Cochliopa lubrica (Müller). MAN. Grande Pointe. SASK. Kamsack, near Lake Madge as above; Wadena, near Foam Lake; Wynyard, near Little Quill Lake; Kelliher; Touchwood.

Family ZONITIDAE

Vitrina limpida Gould. ONT. Fort Frances. MAN. Grand Beach. SASK. Quill Lake (station); Watson; Dalesford, near Lake Lenore; Kelliher; Touchwood.

Retinella hammonis (Ström). ONT. Fort Frances; Rainy River. MAN. Grande Pointe; Grand Beach; near Clearwater (Atikamge) Lake, Hudson Bay Railway. SASK. Kamsack, near Madge Lake as above; Wynyard, near Little Quill Lake; Dalesford, near Lake Lenore; Kelliher; Touchwood.

Euconulus chersinus polygyratus (Pilsbry). MAN. Snake Island, Lake Winnipegosis. SASK. Kamsack, near Madge Lake as above; Kelliher; Touchwood; Dalesford, near Lake Lenore; Humboldt; Saskatoon.

Euconulus sp. ONT. Rainy River. SASK. Wynyard, near Little Quill Lake.

Zonitoides arboreus (Say). ONT. Rainy River. SASK. Kamsack, near Madge Lake as above; Kelliher; Touchwood.

Family ENDODONTIDAE

Gonyodiscus cronkhitei anthonyi Pilsbry. ONT. Rainy River. SASK. Kamsack, near Madge Lake as above; Quill Lake (station); Wynyard, near Little Quill Lake; Dafoe; Watson; Dalesford, near Lake Lenore; Kelliher; Touchwood.

Family SUCCINEIDAE

Succinea retusa Lea. MAN. Portage la Prairie. SASK. Margo, Margo Lake; Kuroki, Fishing Lake; Clair Brook, one mile west of Clair station; Dafoe; Wynyard, mouth of Wynyard Creek.

Succinea ovalis Say. ONT. Rainy River. MAN. Grande Pointe; near Clearwater Lake, Hudson Bay Railway. SASK. Kelliher; Touchwood.

Succinea grosvenori Lea. SASK. Dalesford, near Lake Lenore.

Succinea avara Say. MAN. Near Clearwater Lake, Hudson Bay Railway. SASK. Dafoe; Touchwood, between siding and Hudson Bay Lake.

Family LYMNAEIDAE

Lymnaea stagnalis appressa Say. MAN. Birtle, marshes along the bed of Birdtail Creek, and also in many ponds and small lakes north of this point. SASK. Kamsack, pond one half mile west of Kamsack, also in Madge Lake, twenty miles north of the town. Margo, Margo Lake; Kuroki, lake one mile north west of Whitesand Lake; Wadena, Foam Lake; Paskwegin Brook, and in small lake two miles south of Paskwegin siding; Elfros, Birch Creek; Quill Lake (station), Quill Creek; Watson, Ironspring Creek; small lakes between Kelliher, Touchwood, and Hudson Bay Lake; Dalesford, creek flowing into Lake Lenore, two miles south of the hamlet of Dalesford.

Lymnaea megasoma (Say). MAN. Rennie, Rennie River.

Lymnaea caperata Say. ONT. Fort Frances. MAN. Grande Pointe; Birtle, ponds and small lakes north of Birtle station. SASK. Kamsack, pond one half mile west of this town; Elfros; Birch Creek; Kuroki, Van Patten Creek; Clair, Clair Brook, one mile west of Clair station; Quill Lake (station), Quill Creek; Watson, Iron Spring Creek; Lanigan; Kelliher; Touchwood; Dalesford, creeks flowing into Lake Lenore.

Lymnaea sp. (probably *vahllei* "Beck" Moller). MAN. Grande Pointe. SASK. Kamsack, pond in small muskeg one mile west of Madge Lake, Duck Mountain; Kuroki, unnamed lake one mile north west of Whitesand Lake, also in Fishing Lake; and Van Patten Creek; Paskwegin Brook, also in Little Quill Lake three miles south of Paskwegin

siding; Clair, Clair Brook, also in dry drainage ditch south of Clair; Creek between Clair and Quill Lake (station); Quill Lake (station) Quill Creek; Wynyard, large ponds near Little Quill Lake; Watson, Ironspring Creek; Kelliher; Touchwood; Dalesford, creek flowing into Lake Lenore, two miles south of the hamlet of Dalesford.

Family PLANORBIDAE

Planorbis trivolvis Say. ONT. Fort Frances; Rainy River. MAN. Grande Pointe; Onah, Douglas Lake. SASK. Kamsack, pond one half mile west of Kamsack, Madge Lake as above, pond in small muskeg one mile west of Madge Lake; Kuroki, Fishing Lake; Elfros, Birch Creek; Wadena, Foam Lake; Paskweggin, Paskweggin Brook; Clair, Clair Brook, one mile west of Clair station, also in creek between Clair and Quill Lake (station); Quill Lake (station), Quill Creek; Watson, Ironspring Creek; Kelliher; Touchwood; Dalesford, creek flowing into Lake Lenore, two miles south of the hamlet of Dalesford; Yonker, Eyehill Creek; Ingebright.

Planorbis binncyi Tryon. MAN. Indian Bay station, Falcon Bay; Brereton, Lake Brereton.

Planorbis antrosus striatus Baker. SASK. Kamsack, Madge Lake as above.

Planorbis antrosus var. SASK. Kamsack, Madge Lake, as above.

Planorbis campanulatus wisconsinensis Winslow. SASK. Kamsack, several small lakes in the Duck Mountain near Madge Lake, twenty miles north of Kamsack.



FIG. 1. Variation in the form of the aperture in *Planorbis campanulatus wisconsinensis* Winslow, from Falcon Bay Indian Bay station, Manitoba. Outline drawings made with the camera lucida.

Planorbis exacuous Say. SASK. Kamsack, small lake one half mile west of the ranger's cabin, Madge Lake; Wadena,

Foam Lake; Kuroki, Van Patten Creek; Kelliher; Touchwood.

Planorbis umbilicatellus Cockerell. MAN. Grande Pointe; Birtle, temporary ponds and intermittent creeks north of Birtle station. SASK. Kelliher; Touchwood.

Planorbis sp. (like *parvus* Say). ONT. Fort Frances. SASK. Kamsack, Madge Lake as above; Margo, unnamed lake north of Whitesand Lake; Kuroki, Fishing Lake; Elfros, Birch Creek; Clair, creek between Clair and Quill Lake (station); Dalesford, creek flowing into Lake Lenore, two miles south of the hamlet of Dalesford; Yonker, Eye-hill Creek.

Planorbis sp. (distinct from above). MAN. Lake Winnipegosis.

Segmentina crassilabris Walker. MAN. Grande Pointe.

Segmentina christyi Dall. MAN. Birtle, temporary ponds north of Birtle station. SASK. Kelliher; Touchwood, near Hudson Bay Lake.

Family PHYSIDAE

Physa gyrina Say. ONT. Rainy River, one mile below the Canadian National Railway bridge. MAN. Grande Pointe; Onah, Douglas Lake; ? Clearwater Lake, Hudson Bay Railway. SASK. Margo, unnamed lake one mile northwest of Whitesand Lake; Kuroki, Fishing Lake; Wadena, Foam Lake; Paskwegin, small lake two miles south of Paskwegin siding; Kelliher; Yonker, Eyehill Creek.

Physa ancillaria Say. SASK. Kamsack, Madge Lake as above, also in a small lake a short distance west of Madge Lake.

Aplexa hypnorum Linne. ONT. Rainy River. MAN. Grande Pointe; near Clearwater Lake, Hudson Bay Railway; Birtle, marshes along the bed of Birdtail Creek, also in temporary ponds north of Birtle station. SASK. Margo, unnamed lake one mile northwest of Whitesand Lake; Kuroki, Van Patten Creek, Kuroki Creek; Clair, Clair Creek, one mile west of Clair station, also in creek between Clair and Quill Lake

(station); Watson, Ironspring Creek; Lanigan; Kelliher; Touchwood, near Hudson Bay Lake.

Family VIVIPARIDAE

Campeloma decisum (Say). ONT. Fort Frances, in the Rainy River below this town; Rainy River, in the Rainy River below the Canadian National crossing. MAN. Grand Beach, the Grande Marais.

Family VALVATIDAE

Valvata tricarinata (Say). SASK. Kamsack, Madge Lake as above.

A NEW VARIETY OF ACHATINA PANTHERA FROM
MADAGASCAR

BY WILLIAM J. CLENCH AND ALLAN F. ARCHER

ACHATINA PANTHERA BEREVOENSIS, nov. var.

Shell acutely ovate, moderately solid, the ground color of the nuclear whorl whitish shading off into a pinkish buff on the body whorl, and marked throughout by somewhat irregular chocolate streaks. Nearly every streak on the body whorl is washed on the right with deep neutral grey. Surface covered with axial striae. Each whorl covered with fine spiral lines with the exception of the body whorl where they appear only in a region extending about 15 mm. below the suture: Whorls $6\frac{1}{2}$ to 7. Aperture obliquely ovate, bluish grey within, outer lip slightly buff pink, columella and parietal callus white tinged on the outer lip with coral red. Columella sharply truncate, slender, and curved outwards. Base of lip quite flaring, lip itself emarginate.